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Recommended Citation

Qu, Yuxiu and Zahedi, Fatemeh, "E-Commerce Adoption by Small and Medium-Sized Enterprises in China: The CEO Perspective" (2003). *AMCIS 2003 Proceedings*. 146.
<http://aisel.aisnet.org/amcis2003/146>

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E-COMMERCE ADOPTION BY SMALL AND MEDIUM-SIZED ENTERPRISES IN CHINA: THE CEO PERSPECTIVE

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Abstract

The Internet is changing the ways of doing business in the small and medium-sized enterprises (SMEs) of developing countries. The rapid diffusion of the Internet in China brings Chinese SMEs new business opportunities. This paper proposes a framework for studying the adoption of e-commerce in Chinese SMEs. The research model combines organizational innovation adoption literature and the theory of planned behavior, and cultural studies to develop a conceptual model for investigating e-commerce adoption by SMEs in a different cultural context.

Keywords: SMEs, China, the theory of planned behavior (TPB), Chinese culture, e-commerce adoption

Introduction

The Internet helps developing countries skip several stages of technological development that the developed countries have gone through (Panagariya 2000), and e-commerce provides these countries great opportunities for access to internal and external markets. E-commerce expands market boundaries that are especially beneficial to developing countries (Raisinghani et al. 2002). China, like many developing countries, has recognized the potential value of the Internet and e-commerce and is promoting the use of the Internet. The number of Internet users in China reached 59.1 million by January 2003 (CNNIC Survey 2003). Small and medium size enterprises (SMEs) have a great potential to gain from the expansion of e-commerce.

Small and medium-sized enterprises (SMEs) have had an important role in Chinese economy. By the end of 2001, the number of SMEs reached 29.3 million, hiring 174 million employees, and producing 50.5% of China's GDP (China MOFTEC). The Internet has been changing the current ways of doing business for such companies. The benefits of e-commerce for SMEs include market expansion, sales revenue increase, improved operational efficiency and better customer relationship management (Pflughoeft et al. 2003). Chinese SMEs have started to explore the e-commerce opportunities created by the Internet. However, there is little research about the factors that play a role in e-commerce adoption. Investigating such factors could help in understanding the process by which e-commerce technology expands globally and may provide us a gauge for the expansion of e-commerce in developing countries. In this research, we combine the theory of planned behavior (TPB) with organizational innovation and adoption theories as well as with cultural and management studies to develop a framework for investigating the factors influencing the e-commerce adoption by SMEs in China.

E-Commerce Adoption in SMEs

Researchers have found that e-commerce adoption by SMEs follows sequential process. Korchak and Rodman (2001) presented a four-stage model of SMEs' e-commerce adoption in the United States:

- *Disengaged SMEs* do not engage in any Internet-related activities. These firms do not feel the Internet is important to them.
- *Slow adopters* have access to the Internet, and they do not have a web presence but plan to have one soon. They use mostly desktop computers and dial-up Internet connections.

- *Progressive adopters* have simple web presence, and some have started basic electronic transactions. Many of them use hardware such as LAN and/or laptops, and a faster Internet connection such as DSL or ISDN.
- *Advanced adopters* carry out business transactions on the Internet and/or they have integrated the e-commerce with their back office and offline functions

Daniel et al. (2002) proposed a similar four-stage model for SMEs in the United Kingdom:

- *Developers* have e-commerce services.
- *Communicators* use e-mail to communicate with customers, suppliers and employees.
- *Web presence* have information-based websites and on-line ordering systems.
- *Transactors* have online ordering and payment systems.

Due to the limitation of available resources, SMEs usually cannot move to the most advanced stage of e-commerce at the very beginning. Therefore we expect that the sequential adoption model is universal and that the e-commerce adoption by Chinese SMEs also follows the same pattern. We use the adoption stages in the conceptualization of adoption behavior.

Theoretical Foundation

In forming the theoretical arguments for e-commerce adoption in China, we draw on a number of theories as discussed below.

Organizational Innovation Adoption Theories

Innovation is an idea, practice, or object that is accepted as new (Rogers 1983). Innovation presents the potential adopters with new problem-solving tools or new opportunities (Thong 1999). E-commerce often requires changes in firms' business practices and processes. It enables firms to provide new business opportunities and new lines of products, especially virtual products. Therefore, e-commerce has the characteristics of innovation, and the innovation adoption literature can be applied to e-commerce adoption.

Previous research examined the innovation adoption of different types of technologies. Bretschneider and Wittmer (1993) studied microcomputer adoption. They found that existing IT investment, technological experience, slack resources and level of bureaucracy of an organization have impacts on the adoption of the microcomputer. Chau and Tam (1997) conducted research about the adoption of open systems. They identified three different types of factors: environmental factors (market uncertainty), organizational factors (complexity of IT infrastructure, satisfaction with existing systems, formalization on system development and management) and innovation characteristics (such as perceived benefits and perceived barriers). Thong (1999) studied the adoption of general information systems (IS) instead of one specific IS technology. The findings suggested that the likelihood of IS adoption was significantly associated with CEO characteristics (CEO's innovativeness and CEO's IS knowledge), IS characteristics (relative advantage, compatibility and complexity of IS), and two attributes of organizational characteristics (business size and employees' IS knowledge).

Some researchers studied the innovation adoption specifically in SMEs. Poon and Swatman (1998) studied the Internet adoption in SMEs. They asserted that three types of factors are important, namely, environmental factors (industry adoption rate and value-chain adoption rate), organizational factors (market scope and product characteristics) and managerial factors (management involvement and entrepreneurship).

Researchers have recently started paying attention to the adoption of e-commerce. Kickul and Gundry (2001) found that managerial creativity and functional diversity affect e-commerce adoption. Srinivasan et al. (2002) studied e-commerce adoption from the perspective of technological opportunism. Similar to the factors influencing other innovation adoption, the factors that impact e-commerce adoption belong to three categories: environmental (institutional pressure and technological turbulence), organizational (complementary assets, future focus and organizational culture), and managerial (top management's advocacy). Hence, the literature suggests three types of factors that may affect innovation adoption in SMEs: external/environmental factors, organizational/internal factors and managerial factors.

The Role of CEO on SMEs' Innovation

Characteristics of organizational leaders are identified as the predictor of innovation adoption (Kimberly and Evanisko 1981; Thong 1999). Hambrick and Mason (1984) argued that the values and cognitive bases of top managers could reflect the organizational outcomes. As discussed above, innovation decisions typically involve the top management team as well as external and internal factors. The CEOs act as filtering mechanisms, interpreting these external and internal factors through their own cognitive base and values (Daellenbach et al. 1999). A CEO's characteristics may influence the innovation decisions through the filtering mechanisms. Studies have shown a relationship between top management's characteristics and the firms' innovativeness (Bantel and Jackson 1989; Chaganti and Sambharya 1987; Daellenbach et al. 1999). A CEO is one of the most important individuals of an organization (Castaldi 1986; Shaw 1991). In larger firms it is more difficult to investigate the effects of one person on the organization (Kangasharju 2000), but the role of the CEO is critical in SMEs. The CEOs are often the owners-managers of SMEs. As the main decision makers, CEOs are crucial in determining the innovative attitude of the SMEs (Rizzoni 1991). Therefore, in this research, the conceptualization of the SMEs' e-commerce adoption is based on the CEO's adoption behavior.

Individual Behavioral Intention Theory

Due to the critical role of the CEOs in SMEs, the innovation adoption in SMEs is largely influenced by the individual adoption intention of the CEOs. Therefore, another track of the theoretical background is drawn from individual behavioral intention theory. The theory of planned behavior (TPB) has been widely used to study the behavioral intention of an individual. TPB model is extended from the theory of reasoned action (TRA). TRA is concerned with determinants of consciously intended behaviors. According to TRA, whether a person accomplishes a specified behavior is determined by his/her behavioral intention to perform the behavior (Ajzen and Fishbein 1980). Behavioral intention is determined by both an individual's attitude towards the behavior and subjective norms concerning the behavior (Ajzen and Fishbein 1980).

The above relationship can be formulated as: $B \propto I$ and $I = f(A, S)$, where B stands for behavior, I is the behavioral intention, A represents attitude towards the behavior, S represents subjective norm, and f represents a functional form. The symbol \propto means "is directly proportional to" (Ajzen 1985). Furthermore, the individual's attitude toward a behavior (A) is a function of personal beliefs (b_i) and his/her evaluation of the beliefs (e_i) (Ajzen 1985):

$$A \propto \sum_i b_i e_i$$

Subjective norm refers to a person's perception about whether important referents (e.g., family members or friends) believe he/she should perform the intended behavior (Fishbein and Ajzen 1975). The subjective norm (S) is determined by a multiplicative function of an individual's normative beliefs (n_j) and his/her motivation to comply (m_j) (Ajzen 1985):

$$S \propto \sum_j n_j m_j$$

Ajzen (1985) extended TRA to TPB by adding one more determinant of behavioral intention: perceived behavioral control, which refers to the perceived ease or difficulty of accomplishing the behavior. Perceived behavioral control impacts the behavior through the behavioral intention (Ajzen 1985, 1991).

The Influences of Chinese Culture

Culture can be defined in different ways. Hofstede's (1980) definition is the most widely cited in culture-related studies: culture is "the collective programming of the mind which distinguishes the member of one human group from another" (Hofstede 1980, p 25). National culture builds the foundation of the people's value system in their beliefs and behaviors (Hoecklin 1995). There are subcultures within cultures. Subcultures may hold values and beliefs different from dominant groups based on some factors such as gender, age, education (Purnell and Paulanka 1998).

Chinese culture has a history of over 5000 years, and Confucianism and Taoism philosophies have been deeply embedded in the Chinese people's value systems for more than 2000 years. Chinese cultural values historically have strongly influenced the Chinese management philosophies that are characterized by centralized authority, hierarchical structures and informal coordination (Martinson and Hempel 1995). However, in the past two decades, Chinese firms have increasingly been adopting the Western management styles, philosophies and new technologies to improve their performance. Hence, while we expect that the Western innovation adoption theories to be applicable to Chinese firms, we also expect Chinese cultural values to play a role in the innovation adoption of Chinese firms.

Research Model

In this section, we propose the research model for the e-commerce adoption for Chinese SMEs as shown in Figure 1.

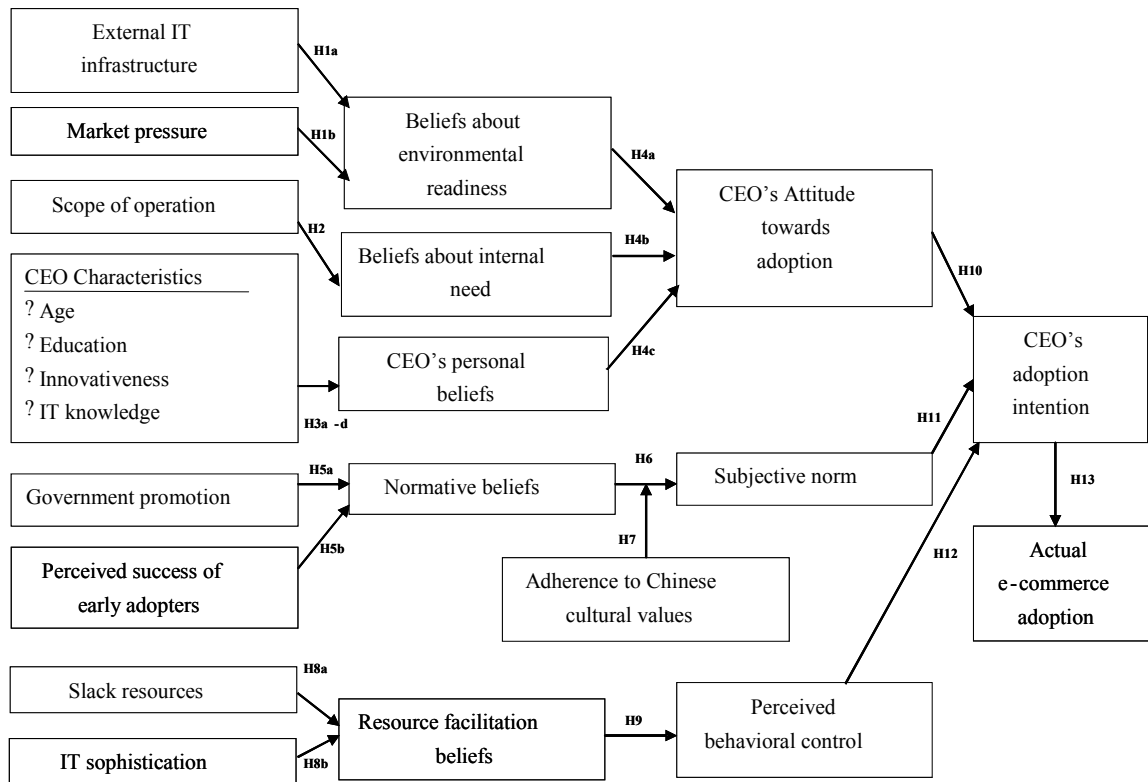


Figure 1. E-Commerce Adoption for Chinese SMEs

The research model is built on the theory of planned behavior (TPB). The SMEs' e-commerce adoption is influenced by the CEO's adoption intention. The adoption intention is determined by the CEO's attitude towards adoption, subjective norm and perceived behavioral control. According to the TBP, attitude is influenced by beliefs. We have grouped the adoption-related beliefs into three categories: external (beliefs about environmental readiness), internal (beliefs about internal needs), and the CEO's personal beliefs. Furthermore, based on the TPB, the normative beliefs and resource facilitation beliefs also impact the behavior intention through subjective norm and perceived behavior control.

Antecedents of Beliefs About Environmental Readiness

China is still a developing country. The development of different areas of China is not balanced and some areas are more developed than others; the IT infrastructure in such areas is more advanced and has a higher quality. Although a similar situation could also exist in the United States and other Western countries, the unbalanced distribution of IT infrastructure is especially

pronounced in China and could have significant impacts on the firms' e-commerce adoption. For Chinese SMEs to adopt e-commerce, they need to have the support of external IT infrastructure. For example, the unavailability of broadband Internet access may restrain the CEOs' enthusiasm for e-commerce adoption in some rural areas. Stylianou et al. (2003) investigated the Chinese business managers' attitudes towards e-commerce. They found that the managers' awareness of technological infrastructure influences organizational commitment to e-commerce driven innovation. Furthermore, e-commerce initiatives may be hindered by the constraints of the infrastructure. Hence, we posit that:

H1a: There is a positive relationship between perceived external IT infrastructure and the CEO's beliefs about environmental readiness for E-commerce adoption.

Poon and Swatman (1998) found that the value-chain adoption rate (the adoption rate in the customers and suppliers of the SMEs) and industry adoption rate are two of the determinants of the SMEs' Internet adoption. The value-chain adoption rate and industry adoption rate represent the market pressure that the firms are facing. Market pressure can come from powerful customers, suppliers or competitors (Pflughoeft et al. 2003). Small businesses, being particularly vulnerable to persuasive marketplace forces (Porter 2001), may be compelled to adopt e-commerce by their large buyers or suppliers. Large competitors may erode SMEs' niche markets through the adoption of new information technologies (Pflughoeft et al. 2003). In order to keep their market share, SMEs may have to follow the competitors' actions and adopt the new technology. Also, SMEs are subject to market pressure due to network externalities, which means an increasing number of users of new technology would encourage more new adopters (Pflughoeft et al. 2003). Therefore, we posit that:

H1b: There is a positive relationship between the perceived market pressure and the CEO's beliefs about environmental readiness for e-commerce adoption.

Antecedents of Beliefs About Internal Need

Scope of operation refers to the firm's product-market domain, which influences the systems and processes required by the firms' internal and external communication and coordination (Daft 1996). Firms with a broader scope of operation often have a more complex network of relations with their trading partners, and usually require communication and coordination with geographically dispersed customers, suppliers and the firms' own branches (Pflughoeft et al. 2003). The competitive advantages brought by e-commerce, such as cost and time saving, would be more visible to firms with a broader scope of operation, and therefore e-commerce would be more preferable to the CEOs of those firms. Hence, we posit that:

H2: There is a positive relationship between the firm's scope of operation and the CEO's beliefs about internal need for e-commerce adoption.

Antecedents of Personal Beliefs

E-commerce adoption is always coupled with risks, and SMEs cannot predict exactly how much they will benefit from the adoption. The risk-taking tendency may influence the CEO's attitude towards e-commerce adoption. Researchers have found that older top executives tend to avoid risks (MacCrimmon and Wehrung 1986). Hambrick and Mason (1984) argued that it is more difficult for the older managers to learn new ideas and behaviors, and therefore the older managers are less inclined to conduct risky actions. Also, in China the younger generation of CEOs is exposed to more Western management philosophy and technologies than the older generation of CEOs because the reform policy started about 25 years ago. The younger Chinese CEOs are more likely to be in favor of e-commerce adoption than the older ones. Therefore, we posit that:

H3a: There is a negative relationship between the CEO's age and his/her personal beliefs towards e-commerce adoption.

An individual's educational background can be used as an indicator of his/her values and cognitive preferences. Previous studies suggested that more educated managers have a more complex cognitive style (Hitt and Tyler 1991; Wally and Baum 1994). Such cognitive complexity leads to a greater capability of learning new ideas and technology and therefore increases the tendency of to adopt innovative approaches. It has been found that the more innovative organizations are led by management teams with higher levels of education (Bantel and Jackson 1989; Hambrick and Mason 1984; Kimberly and Evanisko 1981). However,

Barker and Muller (2002) report that beyond a college degree, the extent of a top manager's higher education has no significant association with the firm's innovativeness. Therefore, we hypothesize:

H3b: CEOs with college degrees have stronger personal beliefs about e-commerce adoption than those without college degrees.

According to Thong (1999), CEO's innovativeness and IT knowledge also have significant influence on the firm's IS adoption. Therefore, we posit that:

H3c: There is a positive relationship between the CEO's innovativeness and his/her personal beliefs about e-commerce adoption.

H3d: There is a positive relationship between the CEO's IT knowledge and his/her personal beliefs about e-commerce adoption.

Attitude Towards E-Commerce Adoption

Based on TPB, attitude is a function of beliefs and the evaluation of those beliefs. Therefore, we posit that:

H4a: Positive beliefs about environmental readiness and evaluations regarding e-commerce adoption positively influence the CEO's attitude towards e-commerce adoption.

H4b: Positive beliefs about internal need and evaluations regarding e-commerce adoption positively influence the CEO's attitude towards e-commerce adoption.

H4c: Positive personal beliefs and evaluations regarding e-commerce adoption positively influence the CEO's attitude towards e-commerce adoption.

Antecedents of Normative Beliefs, Chinese Culture, and Subjective Norm

Normative beliefs refer to referent groups (for example, family or friends) opinions about the intended behavior. In the context of e-commerce adoption in China, we identify the government and early adopters as the relevant referent groups for adoption.

Due to the influence of the political and economic system of centralized authority, the Chinese government can exert more power on businesses than Western countries' governments do. Moreover, Chinese culture is a culture with high power distance and authority is highly respected in the Chinese cultural context. Under the influence of Confucianism, the Chinese culture insists that society should be "well ordered in strict hierarchical relationships: children obey parents, who obey officials, who obey rulers." (Aufrecht and Bun 1995, p177). In such a culture the CEOs have a tendency to follow government policy. Therefore, we posit that:

H5a: There is a positive relationship between perceived government promotion and CEO's normative beliefs about e-commerce adoption.

Whether the early e-commerce adopters perform well affects the followers' e-commerce adoption. In an individualism-oriented culture, the effects of early adopters may not be highly pronounced because individualists prefer to make decisions on their own. However, Chinese culture is a collectivist culture in which people are expected to follow group values and initiatives in order to gain peer acceptance and social status (Triandis 1995). Modeling and sharing are the typical characteristics of a Confucian culture. A person or an organization with a good reputation and image may be used as a model, and the government and the society would encourage other people and other organizations to follow the model. Therefore, we posit that:

H5b: There is a positive relationship between the perceived success of early adopters and the CEO's normative beliefs about e-commerce adoption.

Furthermore, based on the TPB, we posit that:

H6: The CEO's normative beliefs regarding e-commerce adoption positively influence the CEO's subjective norm.

Due to their diversified backgrounds, CEOs of Chinese SMEs may have different perceptions of Chinese cultural values—some CEOs may favor Chinese cultural values more than others. Chinese cultural values have been measured in a 40-item questionnaire (the Chinese Culture Connection 1987), with a 9-point scale indicating how important each of the items are, where a score of 9 means “of supreme importance” and a score of 1 means “of no importance at all,” as shown in Table 1.

Table 1. The Chinese Value Survey (Source: The Chinese Culture Connection 1987)

1. Filial piety (Obedience to parents, respect for parents, honoring of ancestors, financial support of parents)	21. Sincerity
2. Industry (working hard)	22. Keeping oneself disinterested and pure
3. Tolerance of others	23. Thrift
4. Harmony with others	24. Persistence (perseverance)
5. Humbleness	25. Patience
6. Loyalty to superiors	26. Repayment of both the good or the evil that another person has caused you
7. Observation of rites and social rituals	27. A sense of cultural superiority
8. Reciprocation of greeting, favours and gifts	28. Adaptability
9. Kindness (forgiveness, compassion)	29. Prudence (carefulness)
10. Knowledge (education)	30. Trustworthiness
11. Solidarity with others	31. Having a sense of shame
12. Moderation, following the middle way	32. Courtesy
13. Self-cultivation	33. Contentedness with one's position in life
14. Ordering relationships by status and observing this order	34. Being conservative
15. Sense of righteousness	35. Protecting your “face”
16. Benevolent authority	36. A close, intimate friend
17. Non-competitiveness	37. Chastity in women
18. Personal steadiness and stability	38. Having few desires
19. Resistance to corruption	39. Respect for tradition
20. Patriotism	40. Wealth

In a Confucian-oriented society, notions of harmony and social consolidation are important in social relationships. The Confucian value system advocates loyalty to friends, family, and country (Guan and Dodder 2001; Yuan and Shen 1998). Since, subjective norm is a function of normative beliefs and motivation to comply, the CEOs who are more deeply influenced by Chinese cultural values have stronger motivation to comply with normative beliefs. Therefore, we posit that:

H7: The relationship between normative beliefs and subjective norm is moderated by the CEO's Chinese culture values such that the relationship is stronger for CEOs with stronger adherence to Chinese cultural values.

Antecedents of Beliefs About Perceived Resource Facilitation

Technological skills and abilities are important to innovation adoption (Pennings and Harianto 1992). E-commerce adoption requires the firm to have relevant IT knowledge, hardware and software. Thong (1999) argued that a firm's IS complexity and employees' IS knowledge influence the firm's IS adoption. The barrier due to the lack of IS knowledge inhibits the extent of IS adoption in SMEs (Cragg and King 1993). Better hardware, more sophisticated software, and more IS knowledge reduce the knowledge barriers to innovation adoption (Pflughoeft et al. 2003). The CEO in a firm with greater IT sophistication would have less fear of e-commerce adoption. Therefore, we posit that:

H8a: There is a positive relationship between the firm's IT sophistication and the CEO's beliefs about perceived resource facilitation.

There are three types of firm resources: marketing, technological and financial (Schoenecker and Cooper 1998). Technological and financial resources are both relevant in the context of e-commerce adoption. The firm's available technological resources (hardware, software, employee IS knowledge) are the indicators of the firm's IT sophistication. The firms with slack IT resources may perceive having facilities to adopt e-commerce. Firms without adequate IT resources may also perceive resource facilitation if they could use surplus financial resources to purchase IT resources. Firms without either resource may have a low perception about facilitating resources for e-commerce adoption. Hence, we posit that:

H8b: There is a positive relationship between the firm's slack resources and the CEO's beliefs about perceived resource facilitation for adoption.

Furthermore, based on the TPB, we also posit that:

H9: Positive resource-facilitation beliefs and motivations regarding e-commerce adoption positively impact perceived behavioral control.

Adoption Intention

Empirical studies have found that subjective norm, attitude and perceived behavioral control are significant explanatory variables of behavioral intention (Bagozzi and Warshaw 1990; Manstead and Van Eeklen 1998). Therefore, we posit that:

H10: The CEO's favorable attitude towards e-commerce adoption positively impacts his/her adoption intention..

H11: The CEO's positive subjective norm towards e-commerce adoption positively impacts his/her adoption intention..

H12: The CEO's positive perceived behavioral control over e-commerce adoption positively impacts his/her adoption intention.

E-Commerce Adoption

We use the four-stage model (Daniel et al. 2002) to measure the extent of the firm's actual e-commerce adoption. Based on the TPB, we posit that:

H13: There is a positive relationship between the CEO's adoption intention and the firm's extent of e-commerce adoption.

Conclusion

In this study, we proposed a framework to investigate the e-commerce adoption of SMEs in China. The framework incorporates organizational innovation adoption literature, individual behavioral intention models and Chinese cultural value theories. The research model is built on the basis of the theory of planned behavior (TPB). The SMEs' intention to adopt e-commerce is determined by the CEO's attitude towards adoption, subjective norm and the CEO's perceived behavioral control. We identify a set of beliefs as the antecedents of attitude, subjective norm and perceived behavioral control. Furthermore, we have identified the internal, external, and personal antecedents of the adoption beliefs. We also theorized how adherence to the Chinese cultural values could influence the adoption behavior of Chinese CEOs. The test of the model could increase our knowledge about the factors impacting e-commerce adoption in China.

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